Hydro Forecaster: Groundwater Level Predictor

An Internship Project Presentation

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This presentation details the progress of the Hydro Forecaster internship project.

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- **Organization:** Xebia

Organization Overview: Xebia

Xebia is a global IT consultancy and training provider, renowned for its expertise in cutting-edge technologies.

- Specialises in software engineering, cloud, DevOps, AI, and data analytics.
- Operates across multiple countries, serving a diverse global client base.

Known for delivering innovative and high-quality software solutions.

Mentor Details

Roshi Saxena

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Guided the project through critical phases:

- Data preprocessing techniques.
- ML model design and architecture.
- Deployment strategies for the application.

Internship Objectives

1

Predict Groundwater Levels

Utilise machine learning models for accurate forecasting.

2

Develop Web Application

Create a user-friendly interface for predictions.

3

Apply Advanced ML Models

Implement LSTM for time-series and XGBoost for classification.

4

Solve Real-World Challenges

Address environmental data complexities in forecasting.

Tasks Undertaken

Data Collection & Preprocessing

Gathered data from Telangana groundwater sources, followed by cleaning and K-Means clustering.

Model Training

Trained LSTM for monthly forecasts and XGBoost for manual input predictions.

Feature Engineering

Developed relevant features from weather parameters.

Web App Development

Designed and tested the Streamlit-based web application.

Key Learnings & Challenges

Learnings

- Handling real-world datasets.
- Clustering without predefined labels.
- End-to-end ML pipeline deployment.

Challenges

- Addressing missing target variables.
- Managing inconsistent and incomplete data.
- Tuning LSTM for high accuracy.

Progress Till Date

Data Processing

Preprocessing and clustering phases are fully completed.

LSTM Model

Trained for 6-month groundwater level forecasts.

XGBoost Classifier

Functional for weather-based predictions.

Streamlit Web App

Fully functional and tested locally.

Future Plans

Live Weather API

Integrate for real-time data.

Cloud Deployment

Deploy on AWS/GCP for scalability.

Expanded Forecasting

Include district/state-level predictions.

Mobile App

Develop for farmers and field officers.

Thank You

Gratitude to Xebia, SPSU, and my mentor for their invaluable support.

Hydro Forecaster aims to assist in sustainable water management.

Questions and discussion are welcome.